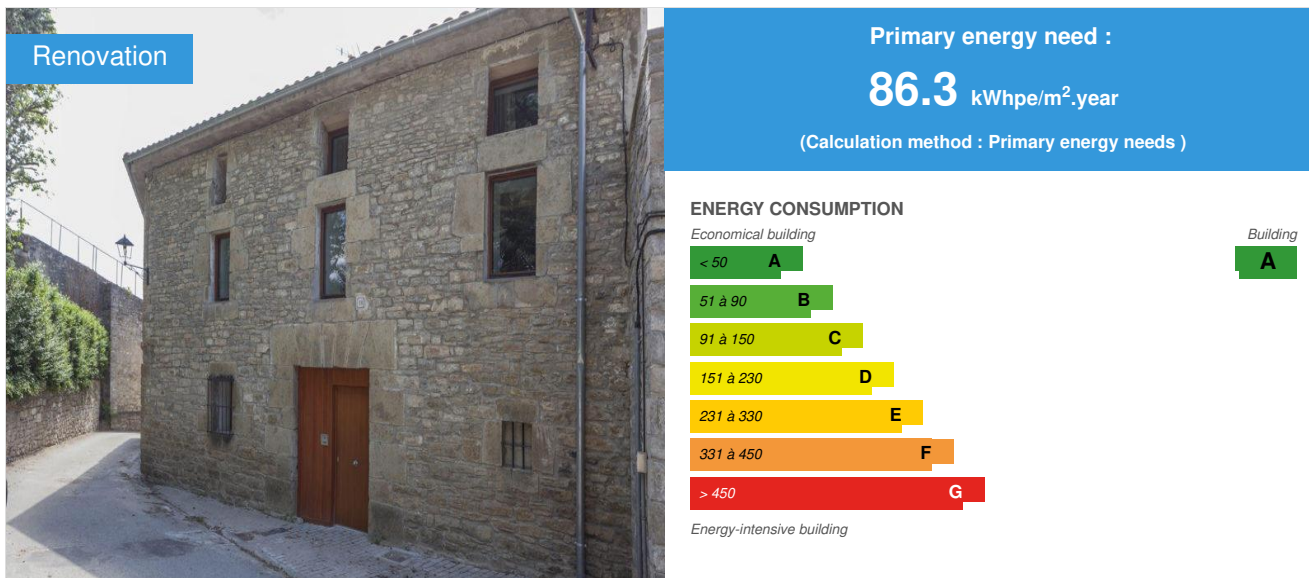


## Passivescape: Country House 1 in Ibero

by [Iñaki Archanco Mancho](#) / 2016-06-30 16:30:30 / España / 10697 / ES



**Building Type** : Hotel, boarding house  
**Construction Year** : 2015  
**Delivery year** : 2016  
**Address 1 - street** : C/ Lareberri 18 31173 ÍBERO, NAVARRA, España  
**Climate zone** : [Dfa] Humid Continental Hot Summer, Wet All Year

**Net Floor Area** : 278 m<sup>2</sup> Other  
**Construction/refurbishment cost** : 335 707 €  
**Cost/m2** : 1207.58 €/m<sup>2</sup>

**Certifications :**



### General information

A cottage, which can be rented for short stays, can be a good choice to publicize the still unknown Passivhaus standard in Spain. Rehabilitation was an interesting option to test the feasibility of the standard in the restoration of buildings.

The starting point was a building in Íbero, a small town near Pamplona, Navarra. The existing building had an irregular plant, with a stone east facade to the Lareberri street, and west facade to the inner courtyard. The construction of this house is traditional, with stone load-bearing walls, wooden beams and ceramic brick cover. It was decided to keep the outer shell, so that the demolition of the other elements was a complex process.

Because we have tried to follow the Passivhaus standard, we have been taken into special consideration issues such as the tightness of the building, to prevent leaks, and the thermal envelope, to achieve a constant and pleasant indoor temperature. Therefore, the sheets have been placed in order to seal all elements of the structure, and a wood fiber insulation has been used through the inside, to isolate evenly all elements and avoid thermal bridges. In the hearth, however, isolation was performed from the outside.

The housing is designed with a constructive system of laminated wood structure, built against the façade preserved and existing party walls, with blown insulation

and interiors finished with plate plasterboard. Ceramic tiles cover and wooden beams have been preserved, using the wood fiber insulation blown by the interior and finish plasterboard. The forged against ground is designed as a hearth with EPS insulation on the outside, and finished with ceramic tiles.

A triple woodwork was chosen with glass and air and argon chambers; the position of the windows and their encounter with the enclosure changes from one facade to another: in the stone facades and old brick were placed with sub-frame, to the inner face; in the half-timbered facades they were placed inside rebateless.

The renovation of the indoor air is performed by a ventilation system with dual-flow heat exchanger of high efficiency, which allows us to heat fresh air driven by the heat extracted from stale air. With a continuous flow of filtered and renovated air, levels of CO<sub>2</sub> and volatile organic compounds (VOC or VOC) are kept to a minimum. It has been installed in the ventilation system, a battery aftertreatment air, before pushing to acclimate the housing.

Production of domestic hot water (DHW) has been fixed with a heat aerothermal pump , to extract energy from the outside air, even at low temperatures. In turn, the heat pump is connected to the radiating panels installed on the walls of the rooms.

All facilities are domotized, which will control the ventilation system, heating and air conditioning, through the Loxone system, connected to a web server which can be accessed from mobile, tablet or PC.

Once the work was finished, the Blower Door seal test was performed, obtaining a result of 0.6 renovations, thus meeting the Passivhaus standard.

## See more details about this project

<http://www.sugeahome.com/>

<http://www.passivescape.com/>

## Data reliability

Assessor

## Stakeholders

### Stakeholders

Function : Designer

BOA arquitectos

correo@boa-arquitectos.com

<http://www.boa-arquitectos.com>

Design and construction management

Function : Developer

Sugea Home S.L.

informacion@sugeahome.com

<http://www.sugeahome.com>

Function : Construction company

Progetic

progetic@progetic.com

<http://www.progetic.com>

Design of installations: ventilation, hot water, air conditioning, home automation

Function : Thermal consultancy agency

Energiehaus Arquitectos S.L.

info@energiehaus.es

<http://www.energiehaus.es>

Advisory

Function :

Madergia

info@madergia.com

<http://www.madergia.com>

Design and structural calculation, assembly

Function : Manufacturer

Stora Enso

bruno.maresca@storaenso.com

<http://buildingandliving.storaenso.com/about-us/company>

Manufacturer of wood products, structural timber ...

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**Function :** Manufacturer

Zehnder Group Ibérica Indoor Climate, S.A.

info.es@zehndergroup.com

<http://www.zehnder.es>

Manufacturer and distributor of ventilation systems

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**Function :** Certification company

Instituto Passivhaus

mail@passiv.de

<http://www.passiv.de>

Certification company

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**Function :** Others

Biohaus Goierri

biohaus@biohaus.es

<http://www.biohaus.es/>

Distributor of isolation from natural wood fibers

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**Function :** Others

Zulziri

zulziri@zulziri.es

<http://www.zulziri.es/>

Performing the sealing and the wooden facades

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**Function :** Others

Onhaus

info@onhaus.es

<http://www.onhaus.es>

Distributor of building materials under the Passivhaus standard

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**Function :** Others

Altertechnica

info@altertech.es

<http://www.altertech.es>

Installation company for ventilation and air conditioning

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## Contracting method

Other methods

## Owner approach of sustainability

Passivescape: Conutry House 1 in Íbero, has been designed and built to the Passivhaus standard, and is currently undergoing certification. The standard gives priority to thermal comfort and to the drastic reduction of energy demands, thanks to thermal insulation, reduction of thermal bridges and ensuring the sealing, which means that cold spots and currents are minimized. As far as possible, they have chosen materials with a low environmental impact, such as the isolation of natural fibers blown wooden structure laminated wood, wood flooring, and the use of cotton and natural latex mattresses and bedding.

## Architectural description

The house has a floor space of 264.60 m2 on 3 floors. The existing building was demolished inside, preserving the cover and the façade to the Larreberri street. It was decided to preserve the facade to preserve its traditional image and become harmoniously integrated into the urban environment. In terms of design, building strategy is based on building a wooden structure inside the preserved envelope, isolating the interior with natural wood fibers and finished with insulated plasterboard panels. The insulation inside ensures the continuity of the thermal envelope, thereby avoiding thermal bridges.

## Building users opinion

The building is convenient, comfortable and maintains a good level of temperature and air hygiene.

## Energy consumption

Primary energy need : 86,30 kWhpe/m<sup>2</sup>.year

Primary energy need for standard building : 284,00 kWhpe/m<sup>2</sup>.year

Calculation method : Primary energy needs

CEEB : 0.0006

Final Energy : 33,20 kWhfe/m<sup>2</sup>.year

Breakdown for energy consumption :

Heating demand: 18.75 kWh / m<sup>2</sup> / a

Hot water demand: 27 kWh / m<sup>2</sup> / a

Initial consumption : 1,00 kWhpe/m<sup>2</sup>.year

## Envelope performance

Envelope U-Value : 0,20 W.m<sup>-2</sup>.K<sup>-1</sup>

More information :

The building envelope is composed of two different types of facade, two types of party walls, deck and slab.

The west facade, the interior courtyard, with a value of U = 0.199 W / m<sup>2</sup> K, described below:

Interior > Exterior

- 30 mm plasterboard panel
- 20 mm -80 mm air chamber natural wood fiber insulation
- 15 mm -160 mm OSB natural wood fiber insulation
- 20 mm -20 mm air chamber pine board

Eastern façade to Larreberri street, with a value of U = 0.175 W / m<sup>2</sup> K, described below :

Interior > Exterior panel

- 15 mm plasterboard panel
- 80 mm wood fiber insulation
- 150 mm natural wood fibers
- 300 mm masonry wall
- 15 mm mortar

The Mediatrix, with a value of U = 0.18 W / m<sup>2</sup> K is described below:

Interior > Exterior panel

- 15 mm plasterboard panel
- 80 mm wood fiber panel
- 150 mm natural wood insulation fibers
- 300 mm masonry wall
- 15 mm mortar

The dividing wall between the two houses, with a value of U = 0.16 W / m<sup>2</sup> K, described below:

Interior > Exterior

- 15 mm plasterboard panel
- 80 mm Rockwool insulation
- 15 mm plaster sported
- 110 mm perforated brick
- 140 mm natural wood fiber insulation
- 80 mm natural wood fiber insulation
- 15 mm plasterboard panel

The cover, with a value of U = 0.22 W / m<sup>2</sup> K, described below:

Interior>Exterior

- 15 mm plasterboard panel
- 30 mm air camera
- 320 mm natural wood fibers insulation
- 10 mm mortar layer
- 40 mm ceramic tile

Flooring on the ground, with a value of U = 0.159 W / m<sup>2</sup> K, described below:

Interior>Exterior

- 10 mm ceramic pavement
- 60 mm screed
- 50 mm insulation Topox Mur CV

-150 mm concrete slab  
-140 mm insulation EPS

Sealing is provided by sheets and wood panels, properly taped between the different materials. The continuity of the thermal envelope is ensured by isolating the interior with insufflated natural wood fibers. The carpenters are wood with a thermal transmittance  $U_f = 0.93 \text{ W / m}^2\text{K}$ . The windows are triple-layer, 4-18-4-18-4, 10% air - 90% argon, with a thermal transmittance of  $U_g = 0.5 \text{ W / m}^2\text{K}$ . The thermal transmittance of the installed woodwork is  $U_w = 0.95 \text{ W / m}^2\text{K}$ .

Building Compactness Coefficient : 0,56

Indicator : n50

Air Tightness Value : 0,60

## Renewables & systems

### Systems

Heating system :

- Heat pump
- Radiant ceiling

Hot water system :

- Heat pump

Cooling system :

- Reversible heat pump
- Radiant ceiling

Ventilation system :

- Natural ventilation
- Nocturnal ventilation
- Free-cooling
- Double flow heat exchanger

Renewable systems :

- Heat pump

## Environment

### GHG emissions

GHG in use : 22,60  $\text{KgCO}_2/\text{m}^2/\text{year}$

Methodology used :

8.5 PHPP with CO2 emissions data GEMIS

Building lifetime : 50,00 year(s)

### Indoor Air quality

Indoor air quality is ensured by using non-toxic, natural and renewable materials along with a mechanical ventilation system with dual-flow heat recovery that provides fresh outdoor air preheated to 100% by stale exhaust air.

### Comfort

Health & comfort : Thermal comfort is achieved thanks to the thickness and proper installation of the thermal insulation, reducing thermal bridges and ensuring the sealing, which means that the cold spots and currents are minimized.

## Products

### Product

Bomba de Calor Rotex HPSU compact 8 kW

Daikin

marketing@daikin.es

<http://www.daikin.es>

Product category :

Integrated compact unit that produces domestic hot water by using the energy stored in ambient air.

Operating according to expectations



Zehnder ComfoAir 550

Zehnder Group Ibérica Indoor Climate, S.A.

info@zehnder.es

<http://www.zehnder.es>

Product category :

Unit-certified Passivhaus Institute. Comfort ventilation up to 550 m<sup>3</sup> / h with automatic bypass in summer. Heat recovery with a yield of up to 95%. efficient electronically commutated motors DC.

Operating according to expectations



Zehnder ComfoPost CW10

Zehnder Group Ibérica Indoor Climate, S.A.

info@zehnder.es

<http://www.zehnder.es>

Product category :

Water coil aftertreatment air. Component installed in the ventilation system Heated fresh air driven to the housing.

Operating according to expectations



Zehnder ComfoWell

Zehnder Group Ibérica Indoor Climate, S.A.

info@zehnder.es

<http://www.zehnder.es>

Product category :

Component installed in the ventilation system that reduces noise generated by the passage of air flowing through the housing.

Operating according to expectations



Loxone Smart Home

Loxone

info@loxone.es

<http://www.loxone.com>

Product category :

Home automation system. The Loxone miniserver is a component which receives data on all installed systems of the House (ventilation, air conditioning, hot water, heating), and you can control, modify and / or monitor from different buttons, smartphone, tablet or PC.

Operating according to expectations



Laminated wood structure

Stora enso

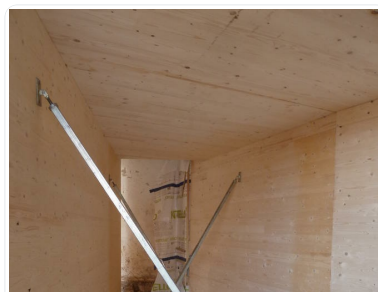
bruno.maresca@storaenso.com

<http://buildingandliving.storaenso.com/about-us/company>

Product category :

Panels of solid wood sheets glued at right angles to each other

Operating according to expectations



## Costs

### Construction and exploitation costs

Cost of studies : 11 031 €

Total cost of the building : 335 707 €

### Urban environment

Ibero is a town 5.66 km long and 203 inhabitants, in the municipality Cendea de Olza in Pamplona (Navarra, Spain). Located 393 meters above sea level, in the vicinity one can find the Araquil and Arga rivers, the Rocks of Etxauri or the Valley of Olo.

### Land plot area

Land plot area : 292,63 m<sup>2</sup>

### Built-up area

Built-up area : 88,00 %

### Parking spaces

2 parking lots inside the building; 4 outside in an open field on urban land.

## Building Environmental Quality

### Building Environmental Quality

- indoor air quality and health
- acoustics
- comfort (visual, olfactive, thermal)
- energy efficiency
- integration in the land
- building process
- products and materials

## Contest

### Reasons for participating in the competition(s)

Esta Casa Rural se ha inscrito en la categoría de Energía y Climas Templados debido a su localización en Navarra, España, que se caracteriza por sus inviernos fríos y lluviosos y sus veranos calurosos con alta radiación solar. Los principios de diseño Passivhaus utilizados en el diseño y la construcción del edificio reflejan los objetivos del equipo, no solo reducir la demanda energética lo máximo posible y maximizar el confort térmico y la calidad del aire, sino también reducir el impacto ambiental con la utilización de materiales naturales con baja energía embebida.

### Building candidate in the category





Energía y Climas Templados

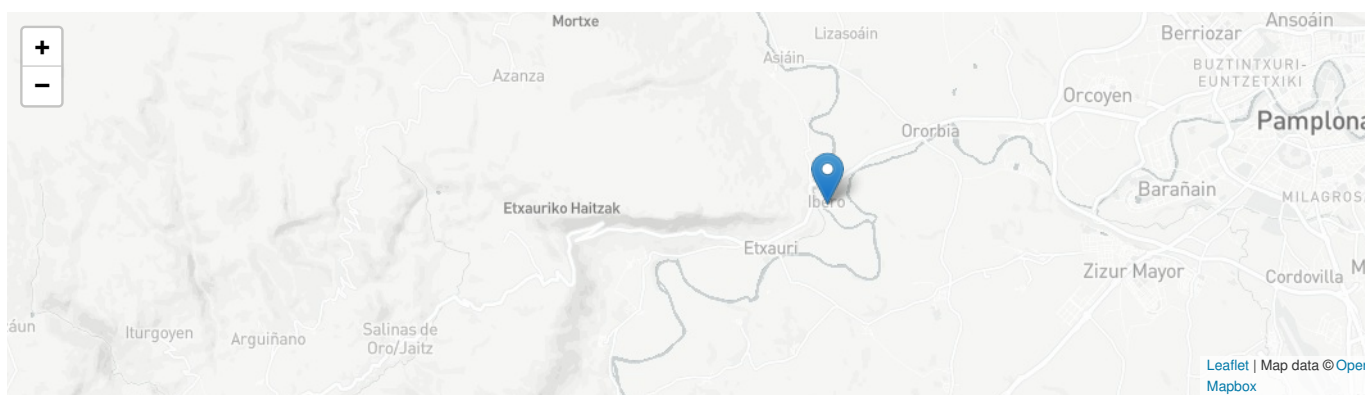


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